CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

SECRET

SECURITY INFORMATION 25X1

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CALIPER GAUGES

1. Caliper gauges were not available in any of the workshops or laboratories in the Institute or on the Island during the first three years. However, beginning in 1949-1950, [redacted] received Soviet caliper gauges and micrometers, which were of average accuracy. When these gauges were not available [redacted] two alternatives. First [redacted] the Soviet "compromise" system of giving a worker the task of always preparing unit or corresponding assemblies. That is, if a lathe man had to turn out a shaft of fine tolerance, he would also have to prepare the corresponding part into which the shaft would be fitted. He would use the trial and error method until he had a satisfactory fitting. It was not possible to break up the work into separate production assignments and engage in multiple production of individual parts. 25X1 25X1 25X1

2. The second alternative was to remove a virtually completed item of machined work from the machine shop and take it to the laboratory where it could be placed under a measuring microscope to determine the degree of error or amount of necessary finishing. The two alternatives listed above applied in all cases where accurate tolerances were required. 25X1

3. [redacted] shortage of multiple volt and ampere meters (Vielfach Strom und Spannungs Messer) [redacted] At first 25X1

25 YEAR RE-REVIEW

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had five of these multiple meters of older German manufacture. One was a Multizet from Siemens, two were A.E.G.'s, and two were Multavi's from Hartmann and Braun in Frankfurt a/Main. In 1950, 15 Soviet post-war multiple voltmeters and 15 ampere meters were delivered These were distributed to the various sectors and were found to be very unreliable. The margin of error was at least ten times greater than that of first five German models. The greatest errors occurred in the alternating current testing, which ran an average of 15% variation. the cause of this severe unreliability in measuring A.C. was due to the cuprox rectifiers which were in the sets.

4. Although the Soviet multiple instruments were exactly identical to the post war Siemens (now called Geraetewerk, Zwoenetz) Multizet II, there was one difference. The German rectifier, the "Maikafer" (cock-chafer, or May beetle) type, had been replaced by the Soviet type, a smaller Cuprox rectifier. cannot definitely state that this rectifier was built in the USSR, but the "Maikafer" is being built by the East Zone German Geraetwerk Zwoenetz (Siemens).

5. The Soviet multiple testers had no manufacturers label other than a five pointed star enclosed by an ecliptical circle (★) on the scale-face. All values and scales were in Russian.

6. needed many testing rectifiers (or cuprox rectifiers) in various current strengths, especially the categories five ma. and ten ma. and 70 ma. could not get these from the Soviets, Although listed in Soviet instrument catalogs, they were apparently unavailable the Soviets have only the selenium rectifier, and the copper sulphide rectifier used for such things as battery charging. never aware that the Soviets have heard of, or possess, the post-war germanium rectifiers. The Soviets themselves admit that the copper sulphide rectifier is of poor quality. The selenium rectifiers are produced in all sizes from 25 ma. to 5 amperes. The Soviets do not seem to be able to produce a reliable, stable cuprox rectifier. This may be for two reasons; first, a lack of Chilean high-grade copper needed to build a stable rectifier; and secondly, the Soviets may not yet have grasped the exact and specific processes of producing this rectifier. From reading the "Physikalische Zeitschrift der USSR", which was published in the German language in the USSR and dated either 1931 or 1932, learned considerable information regarding Soviet development of cuprox rectifiers. There were several articles printed over the span of about 1930-35 concerning the problem of cuprox rectifiers. several articles by Professor FRAENKEL, a Soviet citizen who studied at one time at the Physikalisches Institute at Goettingen. The content of his writings was such the Soviets are completely familiar with all the problems involved in producing the cuprox rectifier.

7. In order to overcome this problem of unreliable rectifiers, the Soviets prefer to use a different system for accurate A. C. testing. They employ the use of a thermo-electric transducer (Thermo-Umformer), which results in the need for a very sensitive registering device to record the data.

8. For the laboratory electrical measuring and testing instruments of accuracy (or error) categories in the class of 1.0 percent of a measuring scale range, the Soviets employ rotary coil systems suspended on journaled points, or pivots. The newest electrical instruments, [redacted] received in 1952, still did not contain ribbon mounted, journaled pivot, rotating coils. 25X1

9. Of the laboratory testing instruments in the category of error at 1.0 percent of scale range, [redacted] two types available which were of Soviet manufacture. [redacted] 25X1

[redacted] The instruments did not bear a trade name as such. The two instrument types were rectangular in shape, one type somewhat larger than the other. The larger instrument contained series resistors, normally built into the set, and was used to test 0-15-30-150-300-600 voltages. For the higher voltages additional resistors were attached. Amperages of 0-30-300 milliamperes were also tested. The instrument was about 180 x 180 x 75 millimeters. There were at least twelve of these instruments, each with three or four terminals. The smaller instrument, size 135 x 120 x 40 millimeters, usually with three terminals, contained both series and shunt resistors. Voltage testing ranged from 0-1-1.5-3-15-30, with series resistors on exterior connection increasing the range to 75-150-300-600 volts. Amperages of 0-30-300 milliamperes were tested and with the shunt resistors added, the testing range was increased to 750 MA-1.5 A-7.5-15 to 150 amperes.

10. The Soviets presented [redacted] two master test instruments (Normal Geraete), one for testing voltage and the other for current testing, in 1948. These were again without marking so that origin or manufacturer cannot be determined. The scale face bore the following emblem: [redacted]. All the scale description was in Russian. This master tester was in the 0.2 percent class and was quite large (400x400 x 120 mm.). It employed the ribbon-suspended (non-pivot) moving coil system, with the scale consisting of the underlaid mirror and knife edge pointer method. The instrument itself had three adjusting screws and a leveling bubble. The ribbon-suspended moving coil measuring system was mounted inside a metal housing within the test instrument in order to shield the coil from external magnetic influence. 25X1

11. [redacted] these two instruments were of exceptionally good quality. However, the series resistors on the volt tester were poor. Before [redacted] able to use the voltage tester, [redacted] had to completely rewind the series resistors. The original windings had torn in many places along the edges of the resistors. [redacted] attributed this to the type and quality of lacquer used initially to build the resistors, since the lacquer had probably shrunk with the resultant tearing effect. 25X1 25X1 25X1

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12. [redacted] all scale faces of Soviet instruments are painted and interpolated by hand. [redacted] 25X1 For larger and more specific scales, the Soviets employ a combination to achieve the desired accuracy. For such an instrument as the master testers, mentioned previously, a scale was drawn on paper and made accurate dimension wise. Then it was photographed, reduced to tester scale face size, and installed in the testers.

OSCILLOGRAPHS

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13. The Soviets do not possess an oscillograph of their own invention [redacted] In very recent years (since about 1949) [redacted] Soviet oscillograph on Gorodomlya Island. This instrument was the exact copy of its American parent model, a six loop, case-type recording oscillograph. [redacted] 25X1 The Soviets listed only this one oscillograph in the parts and instrument catalog [redacted] The film track on this oscillograph was somewhat too exactly copied. The Soviet film, which was considerably thicker than German or American strips, caused continual malfunction because of bunching or leafing. (In German the term "film salad" is used to describe this problem.). Consequently we used German film for [redacted] work on the Island. 25X1

14. The Soviets also have a very good copy or "re-invention" of the Dutch Philips electronic oscillograph. [redacted] 25X1 The electronic copy was an excellent well constructed instrument.

15. In the whole Institute [redacted] four three-loop portable oscillographs built by Siemens. One was prewar, the other three were postwar manufacture. [redacted] two six-loop, non-portable, postwar oscillographs from Siemens(Zwoenetz). There was also one twelve-loop oscillograph, prewar make, from Siemens. 25X1 25X1

16. [redacted] the German-make three-loop oscillographs [redacted] had considerable difficulty with the oscillograph paper, a Soviet product of poor quality. Whenever delicate work was involved [redacted] received Mimose paper from Dresden with which to do the work. 25X1 25X1

17. There were five two-beam electronic oscillographs in the Institute. These were built in Nordhausen and had German markings, legend, and instructions. [redacted] also had about fifteen small electronic oscillographs of prewar delivery and of German manufacture. 25X1

EAST GERMAN INSTRUMENTS RETAIN TRADEMARK SYMBOL

18. Beginning with 1951, instruments coming out of the East Zone of Germany had Soviet markings and carried, concurrently, a German manufacturer's label in Russian as follows: "Zavod _____, firm name, city". Before 1950, [redacted] received optical instruments, such as microscopes, metal microscopes (Zitophot), three sizes of 25X1

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measuring microscopes (from Zeiss), with diameters from 20mm to 250 mm, and binocular magnifiers, all of which still bore the German firm trademarks but no lettering of any kind. All legend or designation lettering was in Russian. After 1950, the same instruments which were received bore the German trademark symbol (these may be reversed) but the trade or firm name appeared in the Russian language.

Busch 

Zeiss 

Fine Gauge Manometers (Fein Mess Manometer)

19. [redacted] fifteen of these instruments of 0.5 percent accuracy used to gauge [redacted] lesser manometers. The fine gauge manometers had Soviet scaling and designation [redacted] 25X1
[redacted] they came from Shaeffer and Budenberg in Magdeburg, East Zone Germany. [redacted] the 25X1
inner construction of the instruments which was identical to instruments manufactured by this concern for many years past. There were many Soviet manometer types, but none of the quality of the above fifteen.

Microscopes

20. About 1948 [redacted] received a biological microscope which aroused extreme 25X1
interest [redacted] since it appeared to be of German construction, yet was entirely of Soviet designation with the exception of the Busch trademark. [redacted] curious to know if it had been made in 25X1
Germany or in the USSR since it was listed as having been shipped from a Soviet ministry. One day one of the technicians discovered an extra hole in the eyepiece case drawer wall which bore the German word "lehr" (empty) [redacted] concluded it was a reparations 25X1
product.

Vacuum Tube Voltmeters

21. There were more than ten electronic or vacuum tube voltmeters available in the entire sector, used mostly by the H-F people. These were built by Saxonwerk, Niedersedlitz, and had an accuracy of approximately two percent of scale. The Soviet counterparts which were also available had margins of error up to five percent of scale. [redacted] 25X1
numerous actual Soviet models of this instrument which had probably been build before 1946.

22. In 1951, [redacted] received at least five electronic voltmeters which were 25X1
used in the high frequency laboratories to test transmission voltages at the antennas or the final stage of a transmitter. The range of these instruments was from zero to five kilovolts. These instruments had Soviet markings plus a small plaque with "Funkwerk, Erfurt" on it. [redacted] 25X1

Voltmeters and Ammeters

23. One more accurate voltmeters and ammeters came from Apparatewerke, Treptow, earlier A. E. G. Treptow. The Soviets provided [redacted] 25X1
sufficient numbers of these instruments, but all were of less accurate relability in the class 2.5 percent of scale.

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UKW Messsender (Ultra Short Wave Calibrating-Transmitter Test Oscillator)

24. Although there possibly were more than one of these instruments on the Island, [redacted] one used in the high frequency laboratory. 25X1
This was an exceptionally good apparatus and came from a Hungarian manufacturer, firm unknown. It was of new design; [redacted] estimate 25X1
it was designed and built around 1951. [redacted] never became acquainted 25X1
with the inner construction and function of this instrument and cannot state anything about its capabilities [redacted] except 25X1
that it operated in ranges below 100 megacycles. However, the general opinion of those technicians who worked with it was that it was an excellent apparatus.

Other Instruments

25. There were several instruments [redacted] which were of excellen 25X1
quality, but [redacted] not certain if these were entirely of Soviet 25X1
fabrication and construction. Many seemed to combine both Soviet and West European elements of construction. [redacted] as examples, 25X1
the electronic temperature control regulator and the Soviet oscillo-graph patterned after the Dutch Philips model. The electronic temperature control regulator used to control temperatures in the laboratory heating (or glowing) furnace had Soviet tubes and other Soviet parts, but contained Bosch condensers. The Soviet Philips type oscillograph also contained Bosch condensers under two groupings. The first, built into the sets, were of one micro-F and two micro-F with an operating voltage of 110-125 volts. The second group, usually connected with the input net, were of 2x1 micro-F and 2x0.5 micro-F with an operating voltage of 220 volts. Both groups were extremely compact and small in size. The first group had measurements of about 30x6x30 mm. for the 1 micro-F and 30x8x30 mm. for the 2 micro-F. The second group had an approximate measurement of 30x25x30 mm.

Electrical Parts

26. Condensers with styroflex insulation were impossible to obtain from the Soviets so [redacted] dismantled old German electrical instruments and 25X1
cannibalized the styroflex insulated condensers from them.

27. It was impossible to obtain potentiometers with wire windings. [redacted] 25X1
made three [redacted] from available materials, but no new ones were 25X1
ever shipped in from Soviet sources.

28. Electrolytic condensers of Soviet manufacture at Branch No. 1 of Institute 88 were of very poor quality. They lost their capacity rapidly at temperatures of -10 to -20 degrees Celsius. At -30 degrees C. it may be down as low as 10 percent of normal. The electrolytic condensers used in the gyro block with the vibration absorber were built in [redacted] laboratory. 25X1

Agate Support Bearings (Achat Pfanne)

29. The instruments listed in this report such as the voltmeters, the ampere meters, and the galvanometer in the temperature control regulator, contained agate bearings for their rotary coil systems (Drehspul System).

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30. The agate bearings were of good quality. The bearings were always of the same grayish or frosted glass color. An interesting point [redacted] was that the adjusting screw and agate bearing assembly was always the same size, regardless of the size of the instrument in which it had been installed. Although the size, or diameter, of the rotating coil system varied per instrument, it was always journaled in this one size bearing. [redacted] the adjusting screw and agate bearing unit is manufactured as a series product in a separate plant which has no connection with electrical instrument construction.

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31. From [redacted] experience in repairing instruments which contained these agate bearings [redacted] found that almost always they were still serviceable and of good quality. We experienced no defects in the bearing. However, a weakness in the rotary coil systems was the pivot point of the rotating shaft, which was often warped, and bent off center. This was frequently found to be the case and required repair before the instrument could operate well. [redacted] not know where the bearing was made since there were no markings on the unit. (The injection molded die casting which contains the rotary coil system is of a rather soft metal alloy, possibly tin or lead. A hot soldering iron of 270 degrees centigrade would begin to melt this frame, presenting [redacted] an additional problem whenever repairs had to be made on the unit assembly.)

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Soviet Gauge Office (Eichamt)

32. The Soviet gauge office gauges or tests all test and data instruments which are used in the USSR, regardless of whether they are in category 1.0 percent or 2.5 percent. [redacted] not know where the main office is, but one of [redacted] men took several instruments to a branch laboratory in Kalinin for gauging. The unreliability of the gauge office is reflected in the case of the tri-instrument test case [redacted] received sometime in 1950 after it had been tested, approved, and sealed by the gauge office. This instrument was an astatic unit containing a voltmeter, ampere meter, and a watt meter with additional series resistors, and a ring-type transformer. Upon arrival [redacted] discovered that the ampere meter did not function. Consequently [redacted] broke the lead seals, disassembled the instrument, and found that the pivot points of the rotary coil system of the ampere meter were lying outside the agate bearings. It was a fairly simple matter to correct the problem. It seemed a significant characteristic of the gauge office that although they submitted guarantees, warranties, certificates of gauging and testing, and so forth, and sealed the instruments, one could never depend upon each piece of equipment as being operable when [redacted] received [redacted]

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[redacted]